

DIFFERENTIAL DIFFERENCE AMPLIFIER FOR AMPLIFYING  
SMALL SIGNALS CLOSE TO ZERO VOLTS

## ABSTRACT OF THE DISCLOSURE

There is disclosed a differential difference amplifier for  
5 amplifying an input signal close to a negative supply voltage  
and adding an offset voltage to the amplified input signal. The  
differential difference amplifier comprises: 1) a first non-  
inverting input terminal coupled to the input signal; 2) a first  
inverting input terminal coupled to the negative supply voltage;  
10 3) a second inverting input terminal coupled to a feedback  
resistor coupled to an output of the differential difference  
amplifier; and 4) a second non-inverting input terminal coupled  
to the offset voltage. The differential difference amplifier  
also comprises: 5) a first differential transistor pair  
15 comprising a first transistor having a gate coupled to the first  
non-inverting input and a second transistor having a gate  
coupled to the first inverting input; 6) a second differential  
transistor pair comprising a third transistor having a gate  
coupled to the second non-inverting input and fourth transistor  
20 having a gate coupled to the second inverting input; 7) a first  
cascode transistor pair comprising a fifth transistor having a

gate coupled to the first non-inverting input and a source coupled to a drain of the first transistor and a sixth transistor having a gate coupled to the first inverting input and a source coupled to a drain of the second transistor; and

5 8) a second cascode transistor pair comprising a seventh transistor having a gate coupled to the second non-inverting input and a source coupled to a drain of the third transistor and an eighth transistor having a gate coupled to the second inverting input and a source coupled to a drain of the fourth

10 transistor.